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ABSTRACT

This study is an interim follow-up to an investigation of how computer use influences the writing process used by high school students on a direct writing assessment (Wolfe and others, 1994). Whether students with less comfort and experience with word processors would receive lower scores on word-processed essays than those with more comfort and experience with wordprocessing was studied. Also studied was whether differences in the length, neatness, accuracy, and tone of computer-written or hand-written essays by the same student could be attributed to the level of comfort in using a word processor. Interim results with 406 tenth graders indicate that students who have a greater level of comfort and experience using word processors for writing tend to score similarly on direct writing assessments whether the essays are composed on word processors or with pen and paper, while students who are less experienced using computers are more apt to perform better when their writing is composed with pen and paper. Fifteen tables present study data. Appendixes contain the student and teacher questionnaires. (Contains 22 references.) (SLD)

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The Influence of Computers on Student Performance on a Direct Writing Assessment

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Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Running Head: Influence of Computers

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Abstract

This study is a follow-up to an investigation of how computer use influences the writing process used by students on a direct writing assessment (Wolfe, Bolton, Feltovich, & Welch, 1994). Findings from the pilot study and from a review of the literature on word processors and writing led us to investigate the following hypotheses: 1) *Do students who show less comfort and experience with using a word processor compose essays that receive lower scores on word processed essays than students with more comfort and experience using word processors?* and 2) *Are there differences the in length, neatness, accuracy of mechanics, and tone of essays written by the same student on a word processor and with pen and paper that can be attributed to level of comfort and experience in using a word processor?*

This paper is an interim report of a study of these hypotheses. To date, we have collected data and performed preliminary analyses of these data. This report reviews background literature, describes our da a collection procedures, presents preliminary findings. Although our research is on-going and the findings reported here are only preliminary, we have found evidence to support our hypotheses. More specifically, we found that students who have a greater level of comfort and experience using word processors for writing tend to score similarly on direct writing assessments whether the essays are composed on word processors or with pen and paper while students who are less experienced using computers for writing are more apt to perform better when their writing is composed with pen and paper.

Table of Contents

Page

List of Tables 4

Background 5
Prior work 5
Research on Computers and Writing 6

Hypotheses 8

Design 9

Preliminary Results 10
Survey Results 10
Scoring Results 15
Comparison of Groups 17
Content Analyses 20

Conclusions 22

References 24

Appendix A 26

Appendix B 28

List of Tables

Page

Table 1: Years of Student Experience with Computers 12

Table 2: Frequency of Student Computer Use 12

Table 3: Student Preferences for Medium of Writing 13

Table 4: Student Preference for Different Writing Situations 14

Table 5: Student Beliefs about Better Writing 14

Table 6: Student Use of Checking Tools 14

Table 7: Student Evaluation of Keyboarding Skills 15

Table 8: Student Beliefs about Amount of Writing 15

Table 9: Interrater Agreement 16

Table 10: Descriptive Statistics 16

Table 11: Overall ANOVA Results 17

Table 12: Comparison of Computer Use Groups 18

Table 13: Comparison of Student Writing Quality Belief Groups 19

Table 14: Comparisons of Keyboarding Skills Groups 20

Table 15: Mean Content Ratings by Group 21

The Influence of Computers on Student Performance on a Direct Writing Assessment

Background

Prior work

This study is a follow-up to an investigation of how computer use influences the writing process and the quality of the resulting writing when students compose essays for a direct writing assessment (Wolfe, Bolton, Feltovich, & Welch, 1994). That study showed that students use different composing and revising strategies depending on whether they are writing with computer or with pen and paper, supporting the findings of numerous other researchers (as noted in a review of research by Cochran-Smith, 1991). We also found that readers focus on different textual features of the essay when it appeared in a word processed format.

In our original study, students chose the medium (i.e., computer versus pen and paper) in which they composed essays, typically stating reasons for their preference in a subsequent interview. The essays they wrote were then transcribed to the other format (i.e., from handwritten to word processed or from word processed to handwritten), and all essays were scored by trained readers.

We found that transcribed essays were scored lower regardless of the medium of composition, suggesting that readers may be sensitive to losses in meaning that result from the transcription process. This may be a major weakness in studies that analyze transcriptions of student work. We also found that handwritten essays, whether transcribed or original, were scored more reliably than word processed

essays, suggesting that it may be more difficult for readers to ignore textual features of essays appearing in an unfamiliar format (i.e., word processed). Both of these findings highlight the influence that reader perception may play in the evaluation of essays produced on a word processor. Fortunately, there is evidence that readers can be trained to recognize and compensate for these textual differences (Powers, Fowles, Farnum, & Ramsey, 1992).

However, it was the tendency for students to selectively choose the composition medium based on their comfort with technology that compelled us to perform the follow-up study described in this paper.

Research on Computers and Writing

In a review of research related to the effects of word processing on students' written products, Cochran-Smith (1991) summarizes numerous studies and concludes that, given adequate practice using a word processor, student writing composed on a word processor is typically longer (Bradley, 1982; Bridwell-Bowles, Johnson, & Brehe, 1987; Broderick & Trushell, 1985; Collier, 1983; Kane, 1983; Hawisher, 1987), neater (Arnold, Legas, Obler, Pacheco, Russell, & Umbdenstock, 1990; Bridwell, Sirc, & Brooke, 1985; Wolfe et.al., 1994), and more error-free (Levin, Riel, Rowe, & Boruta, 1985; Daiute, 1984) than writing composed with pen and paper.

Research also supports the notion that the social environment typical of a classroom in which word processors are used to teach the writing process may influence the student's awareness of audience. In our pilot study (Wolfe et.al., 1994), we found that students who elected to take their writing assessment on a word

processor were more likely to look at the writing of other students than students who took the writing assessment with pen and paper. Bruce, Michaels, & Watson-Gegeo (1985) observed a similar effect and noted that such an increase in social interaction when writing may encourage students to be more conscious of their writing's audience.

Researchers do not agree about the effects of using word processors on the quality of student writing. Depending on the conditions under which their data were collected, researchers have found that word processed papers may of higher quality than handwritten papers (McAllister & Louth, 1988; O'Brien & Pizzini, 1986) or that there is no difference between the two (Dalton & Hannafin, 1987; Hawisher, 1987). In her review of research on the effects of word processors on student writing, Cochran-Smith (1991) concludes that "there is little evidence that using word processing, in and of itself, improves the quality of students' writing ..." (p. 140). Unfortunately, differences in handwritten and word processed writing that may be attributed to extraneous factors, such as students' word processing skills, have not been examined by writing researchers.

Although studies of the effects of word processing on students' written products have not taken into consideration the students' familiarity or facility with word processors, this seems to be an important issue in determining the fairness and equity of offering alternative testing formats for direct writing assessments. Obviously, students who have no computer or keyboarding skills would not produce high quality writing if given no prior instruction in using a word processor. A number of researchers have documented that children typically spend most of their

time becoming accustomed to the computer, the keyboard, and software commands when first presented with the task of writing on a word processor (Cochran-Smith, Kahn, & Paris, 1988; Morocco, 1987; Porter, 1986). In fact, under extreme conditions, the use of word processing may temporarily reduce the quality of student writing (Flinn, 1985).

When given the choice, students that choose to take writing examinations on computers do so because of the convenience of using correction utilities and the improved appearance of the finished essay. Students who choose to produce handwritten essays typically report feeling uncomfortable about their typing skills, their amount of computer experience, and the use of technology in general (Arnold et.al., 1990; Wolfe et.al., 1994). One would expect familiarity and comfort with using word processors for writing to influence student scores on writing assessments so that students with more comfort and familiarity with computers would perform better than students who lack these experiences. However, this conjecture has yet to be investigated.

Hypotheses

Our current study focuses on how students' comfort and facility with word processors influences their performance on a direct writing assessment. More specifically, we investigated the following questions:

> *Do students who are less comfortable and less experienced with writing with a word processor receive lower scores on writing assessments when word processors are used?*

When directly assessing students' writing using both word processors and pen and paper, are there differences the length, neatness, mechanical correctness, and tone that can be attributed to level of comfort and experience with word processors?

Our study is designed to investigate the following hypotheses:

Students who are uncomfortable and inexperienced using a word processor for writing will produce handwritten and word processed essays that are more dissimilar than essays produced by students with a high degree of comfort and experience using word processors for writing in terms of the following features:

1) *overall content quality,*
2) *length,*
3) *neatness,*
4) *mechanical errors,*
5) *tone.*

Design

This paper is an interim report of a study of these hypotheses. To date, we have collected data and performed preliminary analyses. The remainder of this paper describes our data collection procedures, preliminary findings, and future directions our research will take.

We collected information from 406 10th-grade students from seven secondary schools identified by school administrators as having good computer facilities used to teach writing. Students were asked to complete a questionnaire that elicited information concerning their experience with, attitudes toward, and proficiency with computers (Appendix A). To validate this information, the writing teachers at each school completed a similar questionnaire (Appendix B). Responses were tabulated for descriptive purposes, and these data were used to identify three comparison groups

based on students' levels of 1) *experience using computers outside of school,* 2) *beliefs about which medium produces better writing*, and 3) *keyboarding proficiency*.

Each student was also administered two pre-equated narrative essay prompts on two consecutive days. Students wrote to each prompt for 60 minutes. Students wrote one of the essays in handwriting, and they completed the other using a word processor. Presentation of prompt and composition medium combinations were counterbalanced. Each essay was scored by two randomly-selected professional scorers.

Further analyses were executed by selecting 15 students (five from each of three groups based on their responses to the student questionnaire: those with a *high, medium, or low level of comfort and experience using word processors in writing*). Each student's pari of essays were analyzed by three researchers. Content analyses of these essays focused on differences between the three groups in terms of the amount of text written, the neatness of the text, the accuracy of the mechanics, and the tone of the writing used for each composition medium.

Preliminary Results

Survey Results

Eight teachers completed the survey asking for information about their students, their schools, and how computers are used in writing classes. All teachers taught writing to students in grades nine through twelve. The seven schools ranged in size from under 1000 students to over 2000, with the majority of schools falling in between these numbers. Most of the schools owned between 25 and 50 computers.

All teachers but one reported using computers to teach writing. Most students spent one hour or less per week writing on computers in school because most of the schools do not have computers in every classroom. Instead, the schools' computers are housed in a computer lab that is shared by all students in the school.

A total of 406 students responded to the questionnaire. Table 1 shows that over half the students surveyed reported between two and four years of experience using computers for writing. However, when asked about their experiences using computers outside of school, more students said they had either little (less than one year) or more (five or more years) than was reported for in-school use. This may be an indication of how profound the differences are between students with respect to access to technology. As shown by Table 2, the school setting may be the primary place where many students to gain access to computers. On the other hand, a few students may get more experience with computers outside of school than they do in school. This is supported by the fact that, in school settings, most students reported having little opportunity to use computers for writing. However, when asked about computer use outside of school, twice as many students reported that they did not use computers at all for writing. This information is supported by teacher surveys, which indicated that most teachers believed that only about 20% of their students use a computer at home.

Table 1: Years of Student Experience with Computers

In School	Percent
0 to 1 years	28%
2 years	27%
3 to 4 years	27%
over 5 years	18%
Outside of school	**Percent**
0 to 1 years	34%
2 years	14%
3 to 4 years	21%
over 5 years	31%

Table 2: Frequency of Student Computer Use

In School	Percent
a lot	16%
a little	69%
not at all	15%
Outside of school	**Percent**
a lot	24%
a little	44%
not at all	32%

Table 3 shows that most students preferred to use computers for composing informative writing tasks (e.g., research papers) as compared to personal writing tasks (e.g., journal entries) where the majority of students indicated a preference for using pencil and paper. Results further indicate that computers and pencil and paper were

equally favored when writing in a narrative style. Responses to the teacher survey support these figures.

Table 3: Student Preferences for Medium of Writing

Personal writing	**Percent**
computer	16%
pen	83%
Narrative writing	**Percent**
computer	49%
pen	51%
Informative writing	**Percent**
computer	80%
pen	20%

Table 4 shows that, when asked about formal types of writing such as graded school work, almost all students indicated a preference for using computers. This finding, coupled with the information in Table 3, may indicate that students are more likely to use computers when their work will be evaluated or read by an unfamiliar audience. For informal types of writing, pencil and paper was the preferred medium for most students. Teachers agreed with these responses. This information is supported by the results from two other survey items (shown in Tables 5 and 6) which indicate that students think their writing is better when using computers and that most students use grammar or spell checkers when they are available. Teachers, on the other hand, all felt that student writing is better when composed on a computer.

Table 4: Student Preference for Different Writing Situations

When you need to write something quickly.	Percent
computer	21%
pen	79%
When you are taking a writing test	**Percent**
computer	40%
pen	60%
When your writing will be graded	**Percent**
computer	92%
pen	8%
When your writing will be shared with friends	**Percent**
computer	44%
pen	56%
When you are writing for a test like this one	**Percent**
computer	59%
pen	41%

Table 5: Student Beliefs about Better Writing

In which medium is your writing better?	Percent
computer	69%
pen	31%

Table 6: Student Use of Checking Tools

Do you use spelling or grammar checking software when you write on a computer?	Percent
yes	86%
no	14%

Over half of the students rated their keyboarding skills as good to excellent as shown in Table 7. Most teachers also rated their students' typing skills as good to very good with only two teachers reporting fair or poor typing skills for their students. And in Table 8, students generally did not consider the computer to provide opportunities to write significantly more than when using pencil and paper.

Table 7: Student Evaluation of Keyboarding Skills

Keyboarding Skills	Percent
excellent	8%
very good	19%
good	38%
fair	25%
terrible	10%

Table 8: Student Beliefs about Amount of Writing

In which medium do you produce more writing?	Percent
computer	48%
pen	52%

Scoring Results

Interrater reliability was estimated by computing the correlation between the scores assigned by two independent readers to each essay and the percent of perfect, adjacent, and outside of adjacent agreement for the two independent scores. Table 9 shows interrater agreement. These results indicate that scorers were consistent in their ratings regardless of composition medium.

Table 9: Interrater Agreement

Agreement	Handwritten	Computer
% Perfect	67%	71%
% Adjacent	33%	28%
% Outside Adjacent	0%	1%
Interrater Correlation	0.88	0.93

Table 10 shows the descriptive statistics for the four medium by prompt combinations. The mean scores by prompt are not equal, but are only 1/10th of a standard deviation apart. The mean scores for handwritten essays across prompts are slightly higher than those for computer essays (0.23 standard deviations). The standard deviations for scores were of similar magnitude regardless of medium or prompt.

Table 10: Descriptive Statistics

Composition Medium	Prompt 1	Prompt 2	Across Prompts
Computer	N = 437 Mean = 4.06 SD = 0.85	N = 337 Mean = 3.61 SD = 0.91	N = 774 Mean = 3.87 SD = 0.90
Handwritten	N = 303 Mean = 3.45 SD = 0.96	N = 425 Mean = 3.80 SD = 1.10	N = 728 Mean = 3.65 SD = 1.01
Across Media	N = 740 Mean = 3.81 SD = 0.95	N = 762 Mean = 3.71 SD = 0.97	

A 2 x 2 x 4 (Mode x Prompt x Rater) repeated measures unbalanced ANalysis Of VAriance (ANOVA) showed a statistically significant Subject x Medium

interaction, indicating that students did indeed perform differently on this writing assessment depending on the medium in which their essays were composed. A Mode x Prompt interaction ($F = 18.22$, $df = 1$, $p > F = .0001$) showed handwritten essays were typically scored higher on one prompt and computer written essays producing higher scores on the other one. The lack of interaction between mode and rater indicates that scorers were consistent in their scoring of essays regardless of whether it was composed in handwriting or on a computer. The ANOVA results are shown in Table 11.

Table 11: Overall ANOVA Results

Source	DF	SS	MS	F Value	p
Medium	1	17.320	17.320	49.5	.0001
Prompt	1	1.380	1.380	3.94	.0475
Rater	3	6.627	2.20	6.30	.0003
Medium x Rater	3	2.200	.733	2.09	.0994
Medium x Prompt Group)	1	41.775	41.775	119.27	.0001
Subject (Medium x Prompt)	398	912.625	2.29	6.55	.0001
Error	1094	383.190	.3502		

Comparison of Groups

A series of repeated measures unbalanced ANOVAs (Kirk, 1982) were used to determine whether students with varying degrees of comfort and experience with word processors performed differently on the two media for the writing assessment. Groups were created based on student responses to three of the student survey questions: 1) *How much do you use computers outside of school?*, 2) *Is your writing*

better when you use a word processor or a pen and pencil?, and 3) *How good are your keyboarding skills?*. Only about half of the student surveys could be matched to student essays, so our total sample size for these hypothesis tests is 160 students.

Table 12 shows the first comparison we made. It shows the descriptive statistics of writing assessment scores for students assigned to one of three groups: those who used computers outside of school *none*, *a little*, or *a lot*.

Table 12: Comparison of Computer Use Groups

Group	N	Computer Mean	Computer SD	Pen and Paper Mean	Pen and Paper SD	Difference Between Media
None	23	3.09	0.94	3.80	0.88	- 0.71
A little	73	3.82	0.96	4.05	0.86	- 0.23
A lot	62	4.26	1.03	4.14	0.90	0.12

Table 12 shows that the handwriting mean score for students with little and no experience using computers outside of school is considerably higher than the score for computer-generated essays. On the other hand, the computer score for students who use computers a lot outside of school is slightly higher than the score for the handwritten essays. This interaction is statistically significant with an experiment-wise error rate of $\alpha = 0.05$ using a 3 x 2 repeated measures unbalanced ANOVA ($F = 6.78$, $df = 2$, $p > F = 0.0015$).

Table 13 shows the second group comparison we made. It shows the descriptive statistics of writing assessment scores for students who felt that their

writing is better when composed on a *word processor* and those who believe their writing is better when done in *handwriting*.

Table 13: Comparison of Student Writing Quality Belief Groups

Group	N	Computer Mean	Computer SD	Pen and Paper Mean	Pen and Paper SD	Difference Between Media
Computer is Better	86	4.00	1.02	3.98	0.87	0.02
Handwriting is Better	41	3.68	1.10	4.37	0.86	- 0.69

This table shows that the handwriting mean score for students who expected their writing to be better when composed with a pen and paper is much greater than the computer scores for these students. No such difference was observed for students who felt more comfortable with computer composition. This interaction is statistically significant with an experiment-wise error rate of $\alpha = 0.05$ using a 2 x 2 repeated measures unbalanced ANOVA ($F = 15.25$, $df = 1$, $p > F = 0.0002$).

The third group comparison we made focused on five groups of students: those with *excellent*, *very good*, *good*, *fair*, and *poor* keyboarding skills. Sample sizes, means, and standard deviations for each of these groups is shown in Table 14.

Table 14: Comparisons of Keyboarding Skills Groups

Group	N	Computer Mean	Computer SD	Pen and Paper Mean	Pen and Paper SD	Difference Between Media
Excellent	17	4.29	0.83	4.15	0.79	0.14
Very Good	28	4.45	0.97	4.30	0.81	0.15
Good	59	3.86	1.00	3.94	0.80	- 0.08
Fair	42	3.64	1.09	3.99	1.11	- 0.35
Poor	13	3.04	0.80	3.92	0.76	- 0.88

This table shows that the handwriting mean score for students with poor or fair keyboarding skills is higher than the score for computer-generated essays. On the other hand, students with better keyboarding skills showed smaller differences in the scores for the two modes of composition. This interaction is statistically significant with an experiment-wise error rate of $\alpha = 0.05$ using a 5 x 2 repeated measures unbalanced ANOVA ($F = 3.34$, $df = 4$, $p > F = 0.0118$).

Content Analyses

Three groups of five students (N = 15) were identified based on their responses to the student surveys: those with a *high, medium,* or *low* level of comfort and experience using word processors in writing. Three researchers reviewed both essays written by each of these students. Reviewers were blind to group membership. Content reviews focused on the *length* of the essay (perceived length, ranging from 1 = very short to 5 = very long; and actual word count), the perceived *neatness* of the essay (ranging from 1 = very sloppy to 5 = very neat), the accuracy of *mechanics* (spelling, punctuation, word usage; ranging from 1 = very poor to 5 = very good),

and the degree to which the *tone* of the essay is formal or informal (i.e., familiarity of language, complexity of sentence structure, politeness of voice; ranging from 1 = very informal to 5 = very formal). Raters assigned a rating on each of these scales to each student essay.

Table 15 shows the mean rating assigned to essays in each group.

Table 15: Mean Content Ratings by Group

Group	Medium	Mean Neatness Rating	Mean Perceived Length Rating	Mean Number of Words	Mean Mechanics Rating	Mean Tone Rating
High	*Word Processor*	3.2	3.9	332	3.4	3.6
	Handwriting	2.8	2.5	340	3.6	2.6
Medium	*Word Processor*	4.0	3.8	379	3.4	2.6
	Handwriting	3.4	3.4	334	3.2	3.0
Low	*Word Processor*	3.4	4.2	342	3.6	3.8
	Handwriting	2.8	3.3	437	4.0	3.2
Mean Word Processor		3.5	4.0	351	3.5	3.3
Mean Handwriting		3.0	3.1	370	3.6	2.9

This table shows only small differences between media and groups in terms of these variables. The most notable differences in terms of the overall differences between handwritten and word processed essays are that word processed papers were typically rated as being neater in appearance than handwritten essays and that word

processed papers appeared longer to the raters. In terms of group differences, only one difference is apparent: that students with a low level of comfort and familiarity with word processors tended to write considerably more words in handwriting than they did on a computer. On the other hand, students with medium and high levels of comfort and experience with word processors wrote about the same number of words when composing in each medium.

Conclusions

Although our research is on-going and the findings reported here are only preliminary, we have found evidence to support our hypotheses. More specifically, we have preliminary evidence suggesting that students who have a greater level of comfort and experience using word processors for writing tend to score similarly on direct writing assessments whether the essays are composed on word processors or with pen and paper. On the other hand, students who are less experienced using computers for writing are more apt to perform better when their writing is composed with pen and paper. Content analyses show that facility with the computer may be a determining factor. Students who have had less computer experience tend to write a greater amount when composing with a pen and paper.

Our study also provides evidence that *students favor writing with a word processor when their writing will be read for informative or evaluative purposes*. This may be due to the more attractive appearance of word processed writing. Word processed writing appears both neater and longer than when it is handwritten. We also found evidence that *trained essay scorers are able to score reliably regardless of*

the medium in which an essay was composed. We observed only small differences between interrater correlations and found rater by medium interaction for these students' essays.

Our current plans are to continue this study by doing more in-depth content analyses of the data in this study. More specifically, we intend to expand our sample to include 20 students from each computer experience group and to focus on additional variables such as the extent to which the writing expresses the writer's voice.

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Appendix A

Student Questionnaire

How many years have you been using computers to write?

In School:

1 yr._____ 2 yrs._____ 3 yrs._____ over 5 yrs._____

Outside of School:

1 yr._____ 2 yrs._____ 3 yrs._____ over 5 yrs._____

When you write, how often do you use computers?

In School:

a lot_____ a little _____ not at all _____

Outside of School:

a lot_____ a little_____ not at all_____

How good are your keyboard skills?

excellent_____ very good_____ good_____ fair_____ terrible_____

Which of the following word processor packages have you used?

AppleWorks _____ Microsoft Works_____ Microsoft Word_____
Word Perfect_____ ClarisWorks_____ Other_____

When you write on the computer, do you normally use spell-checkers and/or grammar-checkers?

Yes_____ No_____

For each of the following types of writing, please indicate whether you are more likely to use a computer or a pen and paper?

	Computer	Pen
Personal Writing (writing your journal, letters)	___	___
Narrative Writing (stories, poems)	___	___
Informative Writing (papers for schoolwork)	___	___
Other		

Would you rather write at the computer or with pencil and paper under the following conditions:

	Computer	Pen & Paper
When you need to write something quickly	_____	_____
When you are taking a writing test	_____	_____
When your writing will be graded	_____	_____
When your writing will be shared with friends	_____	_____
When you are writing for a test like this one	_____	_____

When you write using a computer, do you do things differently than when you are using a pen and paper? You might think about what you do when you generate ideas, draft, revise, share with others in the class, and correct mistakes.

When you write using a computer, do you usually write more or less than when you use a pen and paper?

Do you think your writing is better when you use a computer or pen and paper? Why?

Appendix B

Teacher Questionnaire

Teaching Background and School Characteristics

Do you currently teach writing? Yes_____ No_____
If so, which grade? _____
For how many years? 1 yr._____ 5 yrs._____ 10 yrs._____ over 10 yrs._____

What is the size of your school population?
0-300_____ 300-500_____ 500-1,000_____1,000-2,000_____ over 2,000_____

Approximately how many computers are available at your school for student writing?
None_____ 1-25_____25-50_____50-100_____ over 100_____

How long have computers been available at your school for student writing?
1 yr._____ 2 yrs._____ 3 yrs._____ 4 yrs._____ 5 yrs._____ over 5 yrs._____

Teacher Experience With Computers

How much personal experience have you had using computers?
1 yr._____ 2 yrs. _____ 3 yrs._____ 4 yrs._____ 5 yrs._____ over 5 yrs._____

How much experience have you had using computers at school?
1 yr._____ 2 yrs._____ 3 yrs._____ 4 yrs._____ 5 yrs._____ over 5 yrs._____

When teaching writing, do you teach students to use computers? Yes_____ No_____
Why or Why not?

What type of access do you have to computers in your school?
Room_____ Computer Lab_____ Other Location_____

Student Experience With Computers

How many hours per week do your students have access to computers at school?
1 hr._____ 2 hrs. _____ 3 hrs._____ 4 hrs._____ 5 hrs._____ over 5 hrs._____

On average, how many of your students have access to computers at home? (best estimate)
Around 10%_____ Around 20%_____ Around 50%_____ Around 90%_____

How good are your students' typing/keyboarding skills?
Excellent_____ Very Good _____Good _____ Fair_____ Poor_____

During the writing process, when do students seem to prefer computers or handwriting?

	Computers	Handwriting
Prewriting	_____	_____
Peer response and review	_____	_____
Editing and proofreading for publication	_____	_____
Composing and editing on word processors	_____	_____
Collaborative or team writing projects	_____	_____
Writing portfolios used for assessment purposes	_____	_____
Writing with a real-world purpose for an authentic audience	_____	_____
Exploring cross-cultural themes in writing	_____	_____
Other:	_____	_____

During which types of writing tasks do your students show a preference for either computers or handwriting?

	Computers	Handwriting
Personal Writing (journal entries, letters)	_____	_____
Narrative Writing (stories, poems)	_____	_____
Informative Writing (research papers)	_____	_____
Other	_____	_____

How does using computers affect the quality of your students' writing?
Better_____ Worse_____ No Change_____

How does using computers affect your students' attitudes about writing?
Better_____ Worse_____ No Change_____

How do you think your students feel about this testing situation?
Good_____ Fair_____ Not Good At All_____

Considering the following groups, have you noticed any preference in the use of computers?
male_____ female_____
high socio/economic_____ middle socio/economic_____ low socio/economic_____
African-American_____Asian_____Caucasian_____Hispanic_____ Other_____

Advantages and Disadvantages of Computers

Considering your students' writing, what do you think are the advantages and disadvantages of having students write on computers?

	Computers give: Advantage	Disadvantage
Quality of writing	_____	_____
Attitude toward writing	_____	_____
Use of time	_____	_____
Ease of revision	_____	_____
Organizational help	_____	_____
Mechanical aid	_____	_____
Other	_____	_____

What disadvantages, if any, have you, your students, or your school experienced with computers?

30

When using computers, do you see any of the following traits in your students?

_____Enjoyment in their work
_____Eagerness to participate
_____Helpfulness toward classmates
_____Fear of technology
_____Other